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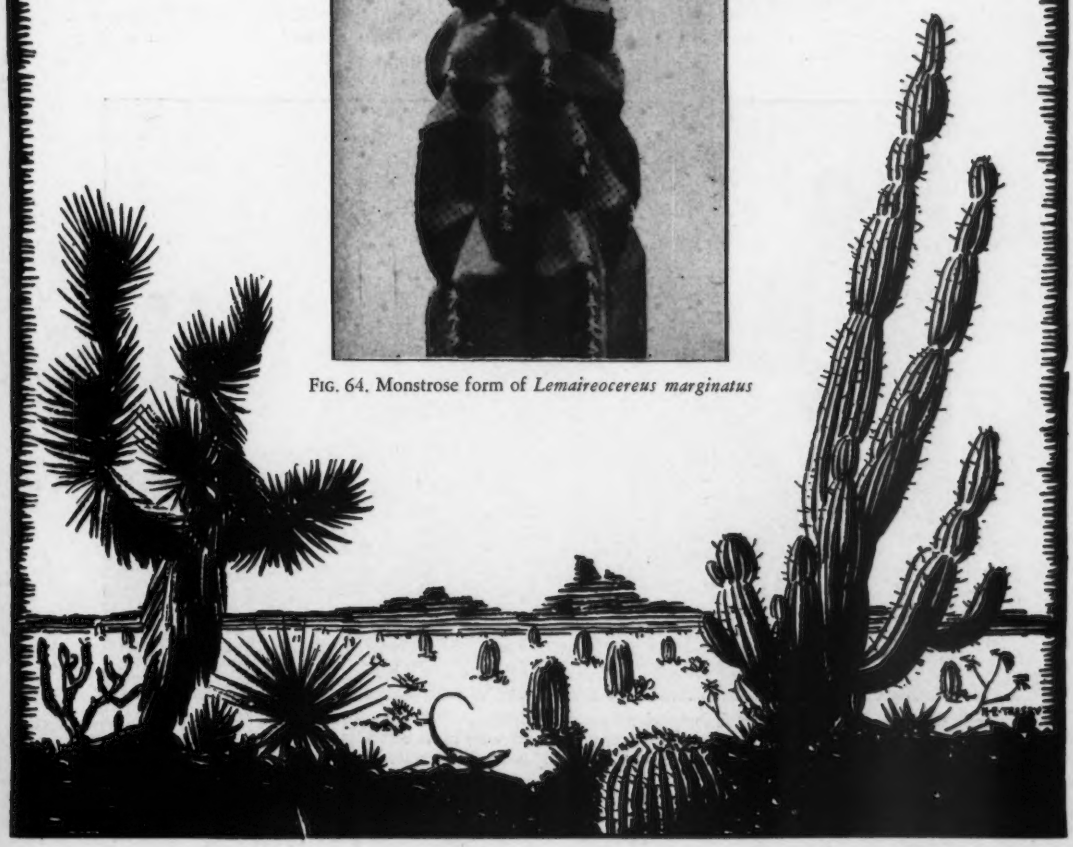
CACTUS AND SUCCULENT JOURNAL

Of the Cactus And Succulent Society Of America

Vol. XXI JULY-AUG., 1949 No. 4

FIG. 64. Monstrose form of *Lemaireocereus marginatus*



CACTUS AND SUCCULENT JOURNAL

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Lemaireocereus marginatus

Cover illustration: This monstrose form was named *Cereus* (now *Lemaireocereus*) *marginatus* forma *gibbosa* by J. A. Purpus in Monat. fur Kakt. in 1913. Note the similarity to the monstrose form of *Lophocereus Schottii* shown on page 117, Aug., 1948, JOURNAL.

BOOK REVIEW

The Huntington Botanical Gardens by William Hertrich. Published by The Huntington Library, San Marino, California. 170 pages, 100 illustrations, limited edition $5.00.

The many friends of William Hertrich, Curator Emeritus of the Huntington Botanical Gardens, will treasure the personal recollections of his work between the years of 1905 to 1949. Although this is not featuring the cactus collection, anyone who has visited the Gardens will be greatly interested in the many activities and responsibilities of Mr. Hertrich in his planning and creating this world famous garden. The book has been printed by order of the Trustees of the Henry E. Huntington Library and Art Gallery as a tribute to William Hertrich on completion of forty-five years of service.

FIG. 65. Society member, Rao Saheb Uttamlal Muljibhai, of Bombay, India, sends this picture of his collection. He says, "I have collected these varieties with great difficulty. Here very few people are interested in a hobby of this kind. Good luck to all interested in cactus and succulents."

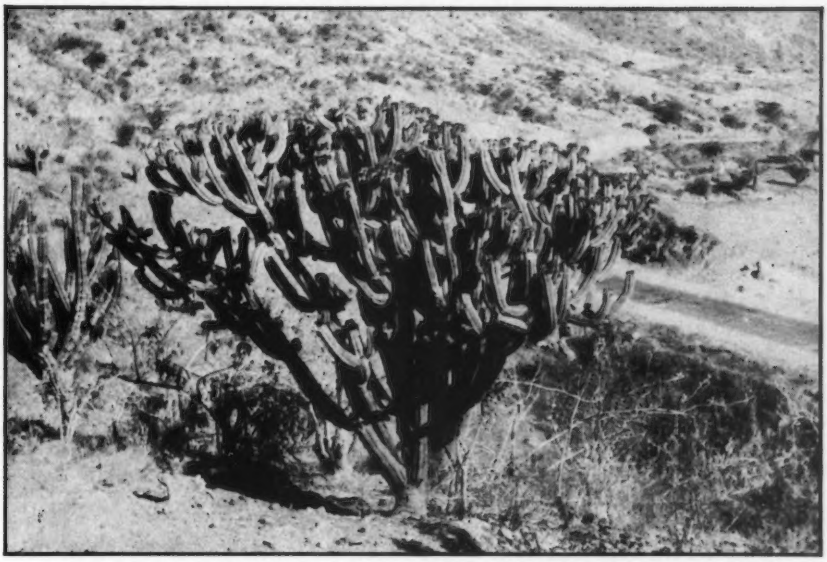


FIG. 66. *Lemaireocereus chichipe* about ten miles NW of Tamazulapan, Oaxaca.

A NATURALIST'S DIARY ON THE MEXICAN WEST COAST

PART VI

By E. YALE DAWSON

Nejapa, Oaxaca—January 8, 1947

Another great day for a cactus fan! From our energizing cool camp last night at almost 6000 feet beside a waterfall and a limestone cavern, we have come down-hill all day. Upon arriving at the edge of the upland valley of Oaxaca we descended abruptly into a sharply dissected system of deep canyons cutting down between arid mountains covered with brush forests and giant cacti. I had thought during the past several days that we were in a region of abundant cacti, but it was nothing like this. Most of the slopes of the upper reaches of the Rio Totolapam abound with the great, branched columns of *Cephalocereus tetetzo* and intermingled candelabra of *Escontria chiotilla, Lemaireocereus chichipe* and what appears to be *Cephalocereus alensis* with its gleaming, white-haired stems. Here and there all the way from Totolapam to Nejapa we have encountered occasional huge plants of *Lemaireocereus Dumortierii,* and among the big *Cephalocereus* stands are multitudes of the neatly spined little *Mammillaria elegans.*

A while ago we stopped in a limestone gorge a few miles northwest of here and encountered some extraordinary things. What caught my eye in this locality was a tall, usually unbranched *Cephalocereus* with a distinctly terminal pseudocephalium and annulate constrictions marking the positions of flower-bearing regions of past seasons. This is surely a remarkable find, for I know of no species of North America with a pseudocephalium of this sort. Also on igneous out-crops in the gorge we found a white-spined *Mammillaria* which may be new. Remarkable is the variation in the spines of plants growing side by side. In some the centrals are less than a half a centimeter long, while in others they are up to 5 centimeters long and gleaming white.[1]

Tehuantepec, Oaxaca—January 10, 1947

As we continued on yesterday down the canyons of tributaries of the Rio Tehuantepec, new cacti kept coming into view so that we were busy all morning hopping in and out of the car for pictures and specimens. Then, just before coming into the town of Tehuantepec we found the most interesting territory of all. About 14 miles west of the town there is a great mountain of lava whose margin parallels the road and a

[1] Recently described as *Mammillaria nejapensis* Craig & Dawson.

dry stream bed. As we approached this volcanic environment I suspected some new cactus forms to appear and so prepared to hack my way a few hundred yards through the brush to make an investigation. I came upon an amazing sight. The black, soilless lava was literally covered with thousands of erect little plants of the same species with the terminal pseudocephalium that we had seen near Nejapa, yet all the plants were a size smaller, perhaps dwarfed by the relatively sterile environment. I'm convinced now that this is a new species,[2] the more so because scattered among these plants is another species which is surely undescribed, a nearly spineless *Cephalocereus* without a pseudocephalium, somewhat suggestive of *C. tetetzo*.[3] In the brush bordering the lava fields are several species I had not seen before, such as *Nyctocereus oaxacensis* and *Cephalocereus Collinsii*. *Pachycereus grandis* has been occasional all the way down from about 3000 feet, but only on the slopes from 1500 feet down to sea level at Tehuantepec has the arborescent *Pereskia Conzattii* appeared in the woodland. Some of these latter plants are 35-40 feet high with spiny trunks 14 inches in diameter.

All the way down from Oaxaca Valley it had been hot and dry, but as soon as we approached the isthmus of Tehuantepec we felt the cooling wind from the Atlantic which blows so prevalently across the lowlands of the Isthmus.

Having passed so recently through the Puebla-Oaxaca highlands with their populations of very typical Mexican dress, the novelty of the Tehuantepecan costume struck us with sharp interest. The flowing skirts of colored cloth and the brilliant, loose-fitting blouses are so strikingly colorful that one must adjust himself to shake off the feeling of watching a dress rehearsal for a technicolor movie. Notwithstanding the very discreet appearance of the women in town, who always are fully clothed from throat to toes, with the most innocent disregard for modesty they will disrobe in public for the necessary activities of washing and bathing in the river.

Since the town of Tehuantepec is neither on the steamship or the rail line, the accommodations for tourists have scarcely changed since the days of Cortez. Our hotel provided only a board bed and a bathroom of marvelous simplicity,—three basins of water and a dipping pan!

Juchitan, Oaxaca—January 11, 1947

We camped in the cemetery of Salina Cruz last night and found it quiet and restful. It lies in a sandy flat near the sea to the south of town and it was so conveniently near the rocky algal collecting localities on the shore, that we felt disposed to provide ourselves with a comfortable camp which would not have to be moved this morning.

The day was grand and the splash of the tropic sea against the clean, sharp rocks of the granite headland was a refreshing change from the many days of journeying through the interior deserts and mountains. The algal collecting was the best we have had since Guaymas, Sonora, and when our buckets were full we set out after lizards and cacti. The first thing to turn up, though, was a surprise: fish-eating bats. Maxine found them in a sea cave and added some to our collections by means of the shotgun. The sandy plains along the coast are well provided with a plant probably identifiable as *Acanthocereus horridus*, and in the rocky coastal hills I found *Cactus oaxacensis* which looks very much like the species of *Cactus* I saw at Barra Navidad to the north some weeks ago.

This afternoon we went out to a little isolated volcanic hill just beyond Juchitan where we found a marvelous succulent flora crowded in a vigorously competitive society on the small rocky pile. This hill is by all odds the most remarkable cactus locality we have found in the isthmus area to date, for in this little spot grow three species of columnar cerei, all of them, I think, undescribed species! The "nude" *Cephalocereus* and the one with the terminal pseudocephalium, both of which we saw the other day west of Tehuantepec, are here and much more luxuriant. Beside these are many massive plants of a new *Lemaireocereus*.[4] The volcanic rock of the hill is covered with mats of what appears to be *Dyckia* with occasional small agaves, and *Bursera* trees give shade for wonderful clusters of mammillarias of several sorts.

Tonalá, Chiapas—January 13, 1947

Today the tropics closed in around us again and the heat has become oppressive. While we sit in the sun in the hot truck the town of Tonalá moves slowly around us in the dust and sweat of the railroad yards. Ox teams pull ploddingly along the road; bags of grain are loaded in the box cars; the peons carry water from the city spigot by the track, and in the midst of all, vultures feed on debris across the street from the main hotel.

Waiting for the flat-car to take us to Tapachula may be tiring and uncomfortably, but we trust it is less so than an attempt to traverse the

[2] Recently described as *Cephalocereus apicicephalium* Dawson.

[3] Recently described as *Cephalocereus nudus* Dawson.

[4] Recently described as *Lemaireocereus setispinus* Dawson.

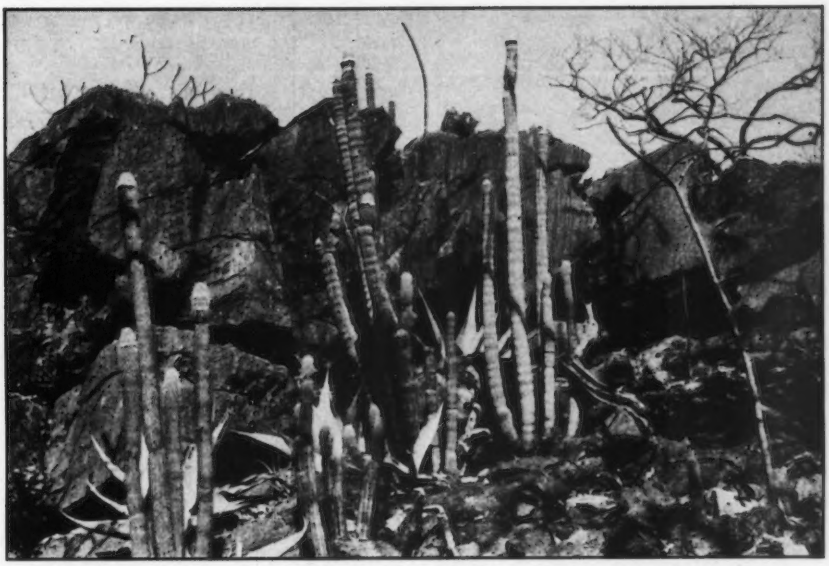


FIG. 67. *Cephalocereus apicicephalium* on lava hills fourteen miles north of Tehuantepec.

desert lowlands of brush in this heat. There is said to be no automobile road, and I'm now inclined to believe them.

Yesterday we enjoyed the Chiapan highlands, for from the Oaxaca-Chiapas border we climbed sharply uphill to about 3200 feet where the weather turned delightfully cool and enabled us to lunch in a grove of pines with a view of broad hill-slopes splashed with the scarlet of *Erythrina* trees in bloom. Orchids and bromeliads are common in the trees of the hills and are often accompanied by epiphytic and vining cacti. All of these features disappeared, however, as we came quickly down to sea-level again on the cobblestone canyon road to Arriga. In fact, the dusty tracks from Arriga to Tonalá traverse an area most amazingly arid for these latitudes. From the amount of vegetation here one would judge the rainfall to be scarcely that of the Mojave Desert of California.

Tapachula, Chiapas—January 14, 1947

The difficulties and discomforts of the road, however wretched and rocky, are not to be compared with life on a Chiapan flat-car. This is the limit! It is now 9 P.M. and we have only just arrived in Tapachula after 26 hours on the way. The distance is only 165 miles.

The railroad business is a riot,—in retrospect, but pretty much of a catastrophe for the poor American suckers who get down here without being able to handle Spanish. The uninitiated traveler who wanders down to the Isthmus of Tehuantepec from the more civilized tourist centers of upper Mexico is really due for a time, which goes something like this: In the absence of a road, if he wants to take a try at touring Guatemala, he learns that he must transport his car by rail. To negotiate with the railroad officials he must first hire a guide and interpretor, for the mechanics of arranging such transportation is far from simple. The station master is often induced to make a flat-car available for hire only after resort to bribery. The freight charges are then paid in addition and the relieved traveler sits down to await the service. None comes, and he then finds that it is necessary to pay the yard engineer to bring the flat-car up to the loading platform. Then he has to find and hire his own loading crew, provide ropes and blocks at his own expense and rent the necessary planks for rolling the car on. Then he is informed that if he rides in his own car he must pay for regular passenger tickets. He may, of course, ride in a passenger coach, but then he has no assurance of arriving at his destination in possession of his car, at least not with its wheels on! He elects the grueling ride in the security of his own vehicle, braves the heat and dust of the road, the pitching and plunging of the rare but rapid advances of the train down the sagging tracks. When finally his destination is reached, if he has been so rash as to have paid his freight bill in advance, or without the aid of an interpretor, he more often than not find that his receipt has somewhere been stamped "collect," whereupon he pays the

FIG. 68. *Cephalocereus nudus* on lava cliffs ten miles west of Tehuantepec.

freight a second time before he is given the privilege of going through the joys of the unloading procedure.

Needless to say, our acquaintanceship with the Mexican people is now sufficiently broad, and our own linguistic relations sufficiently cordial, that we suffered only a necessary minimum of these trials, yet, as it was, they stole our beds out from under us! A while ago our camp cots were removed from under the truck in the darkness while we were inside seeking protection from the mosquito hordes of the jungle swamps into which the desert coast of yesterday has so suddenly been transformed.

Now, notwithstanding the presence of a fine hotel three blocks up the street, we are compelled to spend another night on the flat-car in the railroad yard in order that we may have reasonable expectancy tomorrow of being still in possession of our car and most of its equipment.

Tapachula, Chiapas—January 22, 1947

We arrived in this border town a day too late, and have been thwarted in our plans to get through to Salvador. Fiebre de aftosa (hoof- and mouth disease) has broken out among Mexican cattle and the international borders were closed the 14th while we were riding the flat-car. This now prevents us from making further marine collections in this far southern area except for the mangrove estuaries at Barra Cahuacan. There is plenty to do, though, for the opportunities of studying land botany and for collecting tropical insects are wonderful.

A few days ago we set out for a trip up the gigantic Volcan de Tacaná, a tremendous volcanic cone with its slopes densely covered with the most beautiful tropical forests, and its 13,000 foot peak caressed by the clouds.

Leaving the town of Tapachula we went up to Tuxtla Chica along a road bordered with huge aroids and ferns. Giant trees stand here and there on the gently sloping foothills and their broad lateral branches bear great clusters of orchids and bromeliads. The higher into the hills we rose the richer the epiphytic vegetation became. The jungle closed around us and only in crossing ravines could one get a great enough field of vision to orient himself. The ravines are marvelous with their profuse greenery;—wonderful tree ferns dip their graceful fronds amid flowering vines with their gaudy compliments of brilliant butterflies.

The coffee groves with which the country abounds provided a novel experience in the hunting of lepidoptera, for in the deep shade of trees the transparent winged *Heliconius* butterflies flitted elfin-like through the deep shadows, occasionally catching a glint from a sunbeam, but otherwise blending so imperceptibly with the leafy mosaic as to be quite invisible.

Up and up we went through the forests on narrow cobblestone roads, past burro trains loaded with food supplies for the coffee fincas of the mountains, and others with their loaded bags of coffee coming down. Always above us the towering cone of Tacaná stood with its shoulder against the Guatemala frontier.

Our time is running out and we still have another series of tides to make at Acapulco. Tomorrow we will have to disengage ourselves reluctantly from the comforts of a fine hotel in this strange land, to brave again the terrors of the Tapachula to Tonalá freight, on the first leg of our long journey toward home.

EDITOR'S NOTE

Because of the Convention, we are mailing the July-August JOURNAL early. The next issue will be mailed about September 20th. The color picture in the May-June issue inspired five members to express their appreciation; we may include another plate in the next issue to see if there is more favorable reaction. "Cereusly Speaking" did not arrive in time for this issue because John Rodgers is busy getting ready to attend the Convention; we can look for the continuation of his page in the next issue.

From H. Krainz, Zurich

Photo: Krainz, from the Zürich Succulent Collection.

FIG. 69. *Lobivia Vatterii* Krainz.

Lobivia Vatterii Krainz

(69) This species is the first known *Lobivia* that has white flowers with a black throat. Also, the shape of the body and spines require the establishment of a separate species.

(70) Habitat photo of *L. Vatterii* Krainz. The Zürich Succulent Collection now possesses only three specimens, and these were separated as cuttings from the imported plant. Mr. Vatter, the discoverer of this species, has only one plant from which he has obtained no propagation.

For further text, see the original publication—"Sukkulentenkunde" I, June, 1947. Yearbook of the Swiss Cactus Society.

FIG. 71. *Blossfeldia liliputana.*

Blossfeldia liliputana Werd.

From "Neue und seltene Sukkulenten"

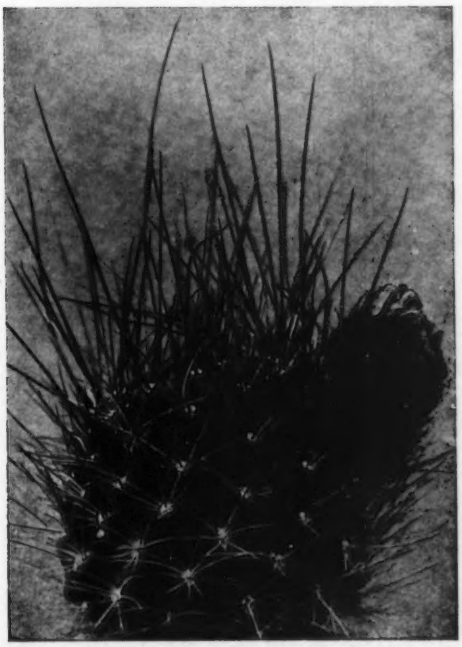


FIG. 70. *Lobivia Vatterii* Krainz.

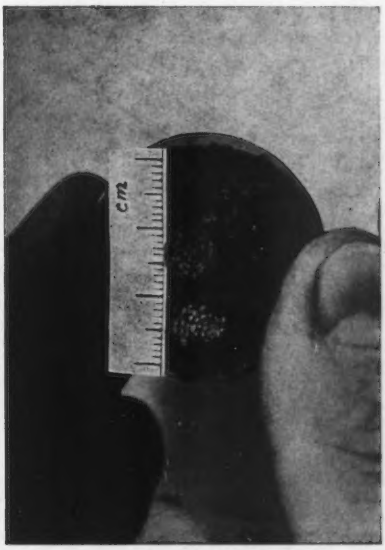


FIG. 72. *Blossfeldia liliputana.*

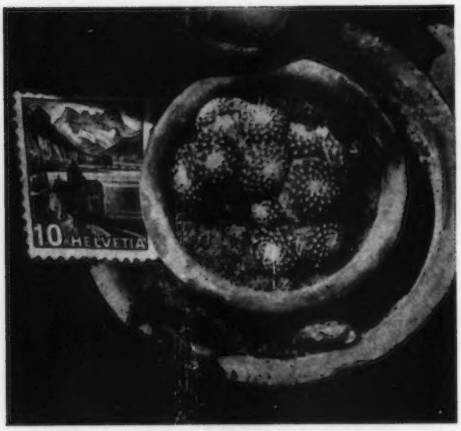


FIG. 73. *Blossfeldia liliputana.*

(71) A clump after arrival in Europe (1940), which later died. The actual body of the plant is only 5 mm. high, all the rest consisting of a turnip-like root.

(72) The plant which still survives, photographed shortly after arrival from Argentina in 1940.

(73) The same grown into a clump after 8 years in the same small pot. (Photographed in 1947.) The plant has two fruit (at upper right), but these contain only sterile seed. By occasionally detaching offsets from the mother-plant we have obtained the first successful propagation of this perhaps rarest and smallest of cactus species.

KNOTTY PROBLEMS IN AUSTRALIA

Mr. Ralph W. Field of Victoria, Australia, opens a vital discussion on the Root-knot Eelworm or Nematodes. He believed that their dry hot summers would make their gardens immune to this pest. Until recent years their plants were imported without roots and thus there was no danger of infestation so he blithely sailed along. Then he sent a plant to Mr. Lawrence Ollason in Sidney who discovered the dreaded knotty roots.

Mr. Ollason had observed nematoes as deep as two feet in a garden that never had a cactus or succulent. In Melbourne they tried to combat the pest with "Clensel" 10 to 1, dipping the plants in the mixture. He goes on to say, "I had a succulent which had it badly, so I potted it in a 3-inch pot and gave it nothing to drink except Clensel 10 to 1 and no other water. Every time I went near the pot I could almost hear the worms yelling for more. After six months treatment I gave it up because the galls looked so cute, plump, and beautiful. I felt like the lady who warmed the water to drown the kittens. Exit Clensel cure! Melbourne is full of nematode regardless of the cold and it also thrives in Adelaide where the climate is humid and hot. It may even attack alternate plants but Echeveria, Cotyledons, and Sempervivums seem to be a particular host. A chap told me that anyone writing books on live hobbies should never mention diseases as it scares people, but I believe that growers should be warned and to seek a cure."

The following notes are from East African Agricultural Journal, July, 1938, by W. V. Harris:

An examination of the roots of some plants will frequently show the presence of swellings or galls on the finer rootlets, while the main roots are distorted and perhaps gnarled and cracked. The reason for this is that the root system has been invaded via the growing points of the rootlets, by minute eelworms or nematodes. The presence of these eelworms in the roots irritate the plants tissues to abnormal growth and the galls or root knots develop. These abnormal cells split and die, giving the galls a characteristic gnarled appearance, and the surrounding tissue is discoloured. The fine sap-conducting tubes inside the rootlets become broken and incapable of taking up water from the soil. The energies of the plant are side-tracked into new root production to replace the losses caused by the eelworms, and the growth of the plant is interrupted. The result depends on the intensity of the attack and the initial vigor of the plant. The extra strain of flowering or fruiting may find the plant so weakened that wilting and death results. The production of secondary rootlets may be sufficient to keep pace with the attack and so enable the plant to develop normally.

The young eelworm hatches out from an egg in the soil. It can remain for months without food. It is also supposed to move through the soil in search of a host, and at least can be carried along by soil water movements. Arrived at an attractive rootlet, the larva works its way into the tissues of the growing point, comes to rest at a suitable spot and begins to feed and develop. If a female, males are not so common, the larva swells as it grows and on reaching maturity is a pear-shaped glistening white globule containing a large number of eggs. According to Goodey, from 300 to 600 eggs are laid by a single female though as many as 1200 have been recorded under particularly favorable conditions.

The optimum temperature for development is given as in the neighbourhood of 81° Fahrenheit, at which temperature an eelworm may grow from a free living larva to an egg-laying female in sixteen days. A further week to ten days is required for the eggs to hatch out. At lower temperatures the development is progressively lower until at 58° F. the period of growth reaches eighty days and the eggs require from five to six weeks for hatching. The ability of larva to penetrate plant roots decreases rapidly with fall in temperature and susceptible crops that will develop around 55° F. may be grown in infested soil.

At a temperature of 110° F. all stages are killed in two hours, and at 135° F. death is instantaneous.

A 1 per cent solution of formalin* at the rate of 1 gallon per 50 cubic feet of soil affectively controlled eelworm and appeared to stimulate the growth of tomato seedlings sown immediately after treatment.

EDITOR'S NOTE: Heating or steaming the soil is no doubt effective as is the recommended rotating of crops but this is difficult to apply to the cactus bed. Commercial growers using raised frames and uncontaminated or sterilized soil seem to raise plants free from nematodes. If you have a plant that stops growing, investigate at once and don't hesitate to de-root it and start again with clean soil. A soil fumigant called Shell D-D and Dowfume N. is recommended in USA but its use nearer than 30 inches of a plant is not recommended. These chemicals contain dichlorpropene and soil so treated should not be planted for two weeks. And don't forget that D-D must be used with caution as it is a toxic to humans.

Has anyone found a sure cure for root-knot nematodes?

*Mr. Ollason tried this double strength, yet it seemed ineffective.

ARIZONA CACTI

No. 4 of a series by R. C. PROCTOR, Phoenix, Arizona.

FIG. 74. *Ferocactus Johnsonii* (Parry) Br. & R. is found in Arizona, California, and Nevada, while the type locality is Utah. In classification this is a plant without a home: Parry called it an *Echinocactus,* Baxter placed it in *Echinomastus,* and now we wonder if it may not be a *Thelocactus!*

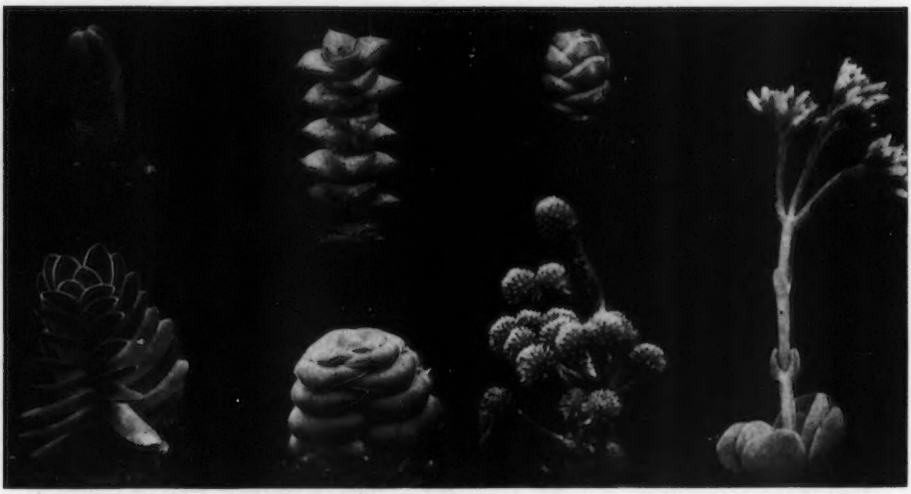


FIG. 75. LEFT TO RIGHT—TOP ROW: *Crassula pyramidalis, C. rupestris, C. teres.* BOTTOM ROW: *C. dejecta, C. hemisphaerica,* (*Sedum multiceps*), *C. falcata minima.*

THE GENUS CRASSULA

From *Cactus Digest*[1] *of the Henry Shaw Cactus Society.*

By ANNA M. FRANK

The genus *Crassula* contains a large number of plants of widely differing growth—creeping, prostrate, clustered, shrubby, and some stone mimics and others moss-like. Their flowers, individually small, are heavily musk-scented, and are borne in large clusters, as varying in form as are their growth habits, the great-majority of them greenish, but there are enough red, pink, yellow and white ones to satisfy everyone.

With a few exceptions the species are "easy" succulents, especially suitable for room and windowsill cutlivation, and also used for commercial purposes.

The Crassulas of South Africa offer more in diversity than any other genus of succulents. They grow in situations of from shade to full sun, and from moist to the most arid conditions. There are over 200 species: some, however, are only annuals, others are only of botanical interest, and many others are not even in cultivation. There are enough forms available to create an interest for any grower or collector.

The flowers of Crassulas resemble those of the Sedums, except that often they are congested into compact heads. In some, the flowers are very conspicuous, often quite beautiful, while in others they are of no significance. The Crassulas are sun-lovers, and thrive best in a rich sandy loam, with a small proportion of leafmold. During their growing season, which is usually from May through January, i.e. for most species, they do like to be watered as freely as other ordinary plants, but in their resting period they should be kept on the dry side. Crassulas propagate easily from leaf and stem cuttings.

One of the handsomest of this genus is *Crassula falcata* with wide flattened and curved leaves. This plant is commonly called "Propellor Plant." The plant blooms freely and bears a large head of bright scarlet flowers in the fall. In some catalogs it is listed as the "Scarlet Paint-brush." The best known of all Crassulas, however, is the one sold by florists under the name "Jade Plant" and erroneously as "Mexican or Chinese Rubber Plant." Even the botanical name has been confusing, often being advertised as *Crassula arborescens.* This name belongs to quite a different plant with larger, gray, red-margined leaves. The correct name for the Jade Plant is *Crassula argentea.* Needless to say, it is native to South Africa and not either to Mexico or China; and it is not a rubber plant but a good tough house plant. It is quite attractive, especially when covered with its starlike white or pinkish flowers. Around

[1]Membership including *Digest* $1.50 per year. *Digest* only $1.00; foreign $1.60. 3339a Virginia Ave., St. Louis, Mo.

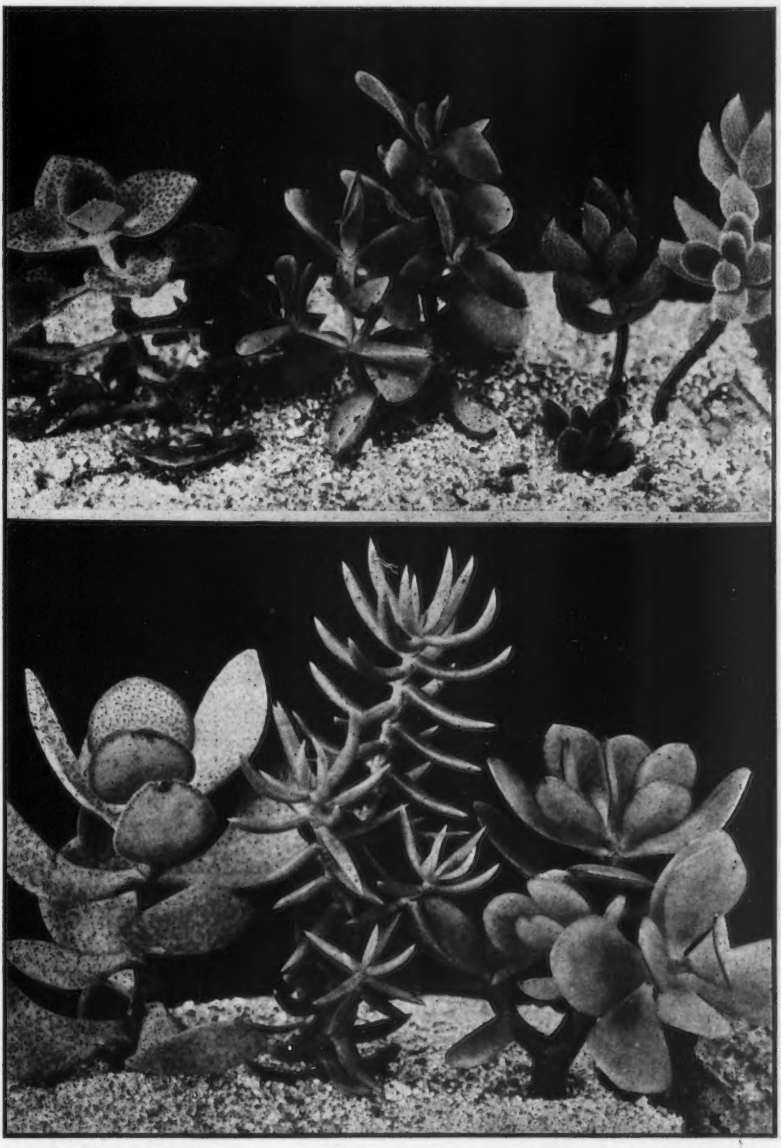


FIG. 76. TOP: *Crassula cordata, C. cultrata, C. trachysantha.* BOTTOM: *C. arborescens, C. tetragona, C. argenta.* A few of the 30 Crassula photos from "Succulents for the Amateur."

Christmas and through January it is probably grown more extensively for planting of bowls, and as a pot plant, than any other succulent. The bright green shiny leaves make it very popular.

Crassula lactea also has nice green leaves, but not so waxy, grows fast and is likewise popular. It will grow nicely on your windowsill. It bloomed for me all winter with pretty white flowers. *Crassula multicava,* another old favorite, bears pink flowers and makes an attractive hanging basket subject. It also blooms in winter—the flowers being very pretty and make a graceful flower arrangement. There is a nice picture of this species on page 87 in your "Succulents for the Amateur" book. I have seen

this plant listed in some catalogs as *Crassula punctata* and that it will bloom in summer, although mine bloomed in midwinter.

Crassula cordata has heart-shaped dotted leaves and pretty pink flowers. This one is also a pretty plant and easy to grow. I have seen it listed under the name of *C. spathulata. Crassula Cooperi** is a low growing plant and anyone that likes dwarf plants it is a 'must' in his collection. It has scattered white hairs and the leaves are crowded into a close rosette, at the base opposite forming a cross. Flowers are pale pink, appearing about May and June. It is very attractive free-growing, free-flowering species. *Crassula deltoides* is another small, low plant, hardy ever more than 3 inches high. Stem and branches are fleshy, of a mealy gray-color, blooms in June.

Crassula arborescens is one of my favorites. It has never bloomed for me but it does not have to because it is so pretty with its thick leaves, strong stem. The leaves are a fleshy gray-green with a red margin and reddish dots on the upper surface. Flowers are white at first, then turn reddish, in June and July. It is a free grower and very suitable for room cultivation.

Crassula rupestris is well known as a hanging basket plant. It looks like square buttons strung on a string. Grown this way the graceful stems hang down the sides of the container and look very pretty. "String of Buttons" is its common name. It always causes interest as each pair of leaves is so strongly united that they look as if they were threaded on the somewhat twisting stems. It makes a beautiful specimen with age and it also has quite attractive flowers. *Crassula perfossa* or *perforata,* and *monticola* are all very similar to *C. rupestris;* in fact I cannot tell the difference. *Crassula alba* is a pretty plant, easy to grow and easy to flower. It blooms white in the summer. *Crassula trachysantha* is another nice looking plant. It is not too hard to grow. The leaves are cylindrical, tapering, closely set with short pointed bristles turned backward. The branches are also hairy, the flowers whitish yellow in summer.

Crassula lycopodioides is very common in collections. Its stem is slender, erect, irregularly branched, with four rows of closely packed leaves the whole length of the stem. Leaves are minute, scale-like, short-tipped and green. The flowers are very tiny, in the axils of the leaves, yellowish-white and appear from spring to summer. It is sometimes called "Princess Pine" because it resembles a dwarf pine tree. *Crassula imperialis* is somewhat like the last, only heavier and more compact and more attractive. The last two are often listed under *C. imbricata.*

Crassult tecta forms a nice clump; the leaves are numerous, thick, semi-circular, green but covered with thick white hairs; the flowers are in close round heads. It likes the sun and a rich soil with sand. Stays small.

Crassula tetragona is likewise well known. It branches like a tree; its leaves are fairly close together and the species is commercially used in dish gardens. Its flowers are small, white, in early summer. *Crassula Schmidti* is very popular, too. Forms a nice clump, has white hairs along the edge of the leaves, flowers are short-stalked, brilliant dark carmine or rose. Blooms in winter. Likes a rich soil but not too much moisture.

Crassula nana is very interesting with tiny leaves. I have never seen it listed in any of the catalogs but Mr. Cass's price list has it. That is where I got my first plant. It roots easily from cuttings. Is very attractive in a small hanging basket.

Then there is *Crassula elata* which certainly is a very fine plant and is easy-to-grow, and free-flowering. *C. elata rosea* turns red when kept in the sun and also makes a suitable hanging basket subject. There are many more species that are very nice to possess but these that I have mentioned are those that are usually seen in collections and that can be bought readily from California nurseries.

*See illus. "Succulents for the Amateur" pg. 83.

BOOK REVIEW

Orchids Are Easy to Grow by Harry B. Logan and Lloyd C. Cosper. Published by Ziff Davis Publishing Company, 350 Fifth Ave., New York, 312 pages, 20 color plates—$6.00.

Anyone can grow orchids. Logan and Cosper point out that those who think they cannot have been influenced by the myths surrounding these aristocrats of the plant world. Beautiful and exotic as these flowers are, they are also amenable to the same principles of culture as the more common plants. Furthermore, they can be grown *at home* in every section of the country without great labor or excessive cost.

A unique feature of the book—and an important part of its plan to simplify orchid growing for the amateur—is a comprehensive table into which all the pertinent facts about the characteristics and culture of many orchids you can grow are compressed. In itself a handy reference manual, it answers all your questions quickly and accurately.

The text—complete and up to the minute on the mechanics of orchid culture—covers home growing, outdoor culture, potting, seed germination, propagation, gravel culture, watering, nutrition, pests, and how to select orchid plants. Cattleya, Bletia, Calanthe, Laelia and most of the genera the amateur is likely to grow are covered in detail. However, the more unusual and rare varieties are discussed for those who may be tempted to try them.

Echinocereus Scheeri Lem.

Plate 14

From Blühende Kakteen—July 30, 1901.

Echinocereus leptacanthus K. Sch.

PLATE 15

Echinocereus leptacanthus K. Schumann, "Gesamtbeschreibung," 260.

Cereus pentalophus P. DC., "Revue des Cactées," 177; var. *subarticulatus* Coulter, loc. cit.; var. *leptacanthus* Salm-Dyck, "Cact. hort. Dyck." (1850), 42.

The correct name for this plant is rather uncertain. It first appeared in the literature as *Cereus pentalophus* P. DC., var. *articulatus*. Later, Prince Salm-Dyck altered the name to *C. pentalophus* var. *leptacanthus*. One can easily suppose, after reading the description, that the type of *C. pentalophus* is identical with *C. procumbens* Eng. The most important character in which the variety differs from the type is that it lacks the central spine, and this circumstance convinces me that my interpretation is correct. However, if one would agree with this, then considerable nomenclature changes would be the next consequence. I am of the opinion that this would be a futile step in dealing with two such distinct species as *Echinocereus procumbens* Eng. and *E. leptacanthus* K. Sch., and I think the subject should be ended with this discussion.

The plant is not very widely distributed in collections, but because of its free growth and beautiful blossoms it deserves greater popularity than do many other of the species. The striking contrast between the white throat and carmine-violet tips of the petals gives the flower a definite charm and therefore provides a showy potted plant; the flowers offer a delightful appearance as they develop for a long time and on all branches.

As already mentioned above, *E. leptacanthus* K. Sch. is related to *E. procumbens* Eng.; it is occasionally confused with it, although *E. procumbens* Eng. is sufficiently distinct through the different appearance of the ribs and the darker green color. Especially noteworthy, however, is the fact that *E. procumbens* Eng. is normally provided with a long central spine which is lacking in *E. leptacanthus* K. Sch. While not all areoles of *E. procumbens* Eng. carry these central spines, one is sure to find them fairly numerous on well-cultivated specimens. The specific name of *E. leptacanthus* K. Sch. (meaning "lightly-spined") is justified in so far as the spines are generally somewhat weaker than in its sister species.

The habitat of this plant is inadequately known other than that it came to us from Mexico. It originated from the great expedition of Coulter which was inspired by the elder De Candolle; the latter, at the time was, writing that extraordinarily comprehensive work "Revue des Cactées." Concerning the exploration of Coulter we are insufficiently informed, although it is known that in 1834 he visited Ehrenburg in Real del Monte. Perhaps it originated in the Mexican highlands where many other species of this genus exist. As the importers have not been bringing to us the less conspicuous plants, the importations of the last year have provided us with no particulars as to this habitat.

Translation by Myron Kimnach

CLASSIFICATION—1949

Notes by W. TAYLOR MARSHALL

Echinocereus pentalophus (De Candolle) Rümpler.

This is one of the many variations to be expected in a species of wide range. Central spines are occasionally wanting throughout the range.

Echinocereus leptacanthus K. Sch.

Plate 15

From Blühende Kakteen—July 30, 1901.

Echinopsis rhodacantha Salm-Dyck

Plate 16

Echinopsis rhodacantha Salm-Dyck, Cact. hort. Dyck. (1850), 39 and 182; K. Schumann, Gesamtbeschreibung, 239.

Echinocactus rhodacanthus Salm-Dyck, hort. Dyck., 341 (1834).

Echinocactus coccineus Otto in Pfeiffer, Enumer. Cact., 50.

Cleistocactus rhodacanthus Lemaire, Illustr. hort. VIII. Miscell., 35.

Cereus rhodacanthus Weber mss. in K. Schumann, Gesamtbeschreibung, 240.

Two years ago, when I first saw this plant blooming in the collection of Herr Graessner (Chief Inspector of Garrison Administration) at Perleberg, I immediately resolved to have it illustrated. Although I had already become acquainted with a description of the flower, I was greatly surprised at its actual shape and color. It has such peculiar properties that one can well understand why Lemaire would separate it from the genus *Echinopsis*. But I certainly cannot quite approve of his action in placing it in his own genus, *Cleistocactus*. He has here placed it together with *Cereus Baumannii* Lem. with which it has absolutely nothing in common, either in the shape of the plant or in the nature of the flower. The Greek word "kleistos" means "closed." By using this name, Lemaire was referring to the flower, which does not open widely as in other cacti, but which is closed at the tip. A very striking character lies in the much exserted stamens, which are met with in only a few cactus flowers (for example, the genus *Nopalea* which Prince Salm-Dyck separated from *Opuntia* solely because of this characteristic).

Examination of the flower gave several deviations from the description of it which we possess. Some of these are doubtless due to individual variations which, in cacti, fluctuate over rather wide extremes, as is well known; others, however, are corrections of obvious errors. For this reason I will repeat once again the description of the flower:

The one to several spindle-shaped flowers appear in the immediate area of the crown, their total length being 7 cm. The ovary is covered with fleshy, closely set, lanceolate, reddish-green scales from the axils of which project white woolly hairs. The tube of the perianth is 4 cm. long, so that the free petals reach a length of scarcely 1 cm.; the largest diameter of the tube, which grows erect, is 1.5-2 cm.; it is covered with lanceolate, tapered, light carmine-red scales. The petals are of a vivid carmine-red, the outer resembling the scales, though somewhat longer, the inner spathulate and slightly toothed. They rest tightly against the stamens so as to completely close the throat of the tube. The numerous stamens extend 1 cm. beyond the end of the flower; the carmine-red filaments have dark brown anthers, the latter being scarcely 1 mm. long. The carmine-red pistil is about as long as the stamens; the 8 stigmas, according to my observations, form a clavate body by means of their being closed together; later they probably radiate separately.

As with so many of the early described cacti, we are likewise inadequately informed as to the habitat of this interesting species. Prince Salm-Dyck declared Brazil to be its homeland; this statement was founded on an error; Pfeiffer came nearer to the truth when he named Mendoza (in Argentina), not far from the Cordilleras, as the source of the species. The area about this city certainly became more distinguished for the abundance of species than any of the localities in the western states of Argentina from which cacti were brought to us. However, the environs of this city have been conceived as covering such a vast area that one cannot really refer the place of origin to the city itself. For many decades the plant was not imported again, so that only a few specimens of the greatest rarity existed in German collections. Recently, however, it has again been brought to us. For the introduction of this plant, as well as for that of many other valuables, we are obliged to Mr. de Laet of Contich who is at present striving with insufficiently rewarded diligence and unselfishness to collect again in Europe the greatest rarities. From him we learn that the plant is an inhabitant of the state of Tucuman, into which extend the snow-clad mountains of the Cordilleras.

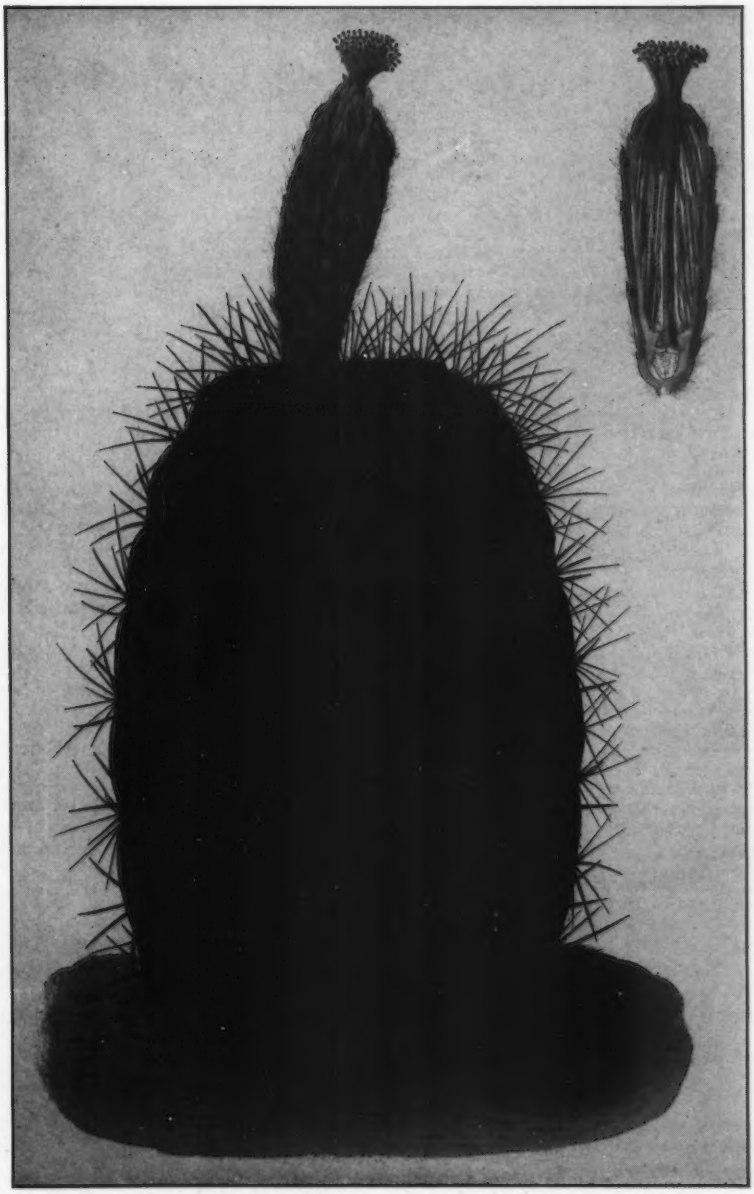
Translation by Myron Kimnach

CLASSIFICATION—1949

Notes by W. TAYLOR MARSHALL

Denmoza rhodacantha (Salm-Dyck) Britton and Rose.

The closed flower resembles *Cleistocactus* but in this species there is a mass of white wool near the base of the tube on the inside. For this reason Britton and Rose placed it in a separate genus, *Denmoza,* an anagram of Mendoza from which province in Argentina their specimen was sent.



Echinopsis rhodacantha Salm-Dyck

Plate 16

From Blühende Kakteen—July 30, 1901.

Cereus speciosus K. Sch.

Plate 17

Cereus speciosus K. Sch. in Naturl. Pflanzenfam. III (6a), 179; Gesamtbeschr., 153.
Cereus speciosissimus P. DC., Prodromus III, 468.

On being presented with this plate of *Cereus speciosus* K. Sch., one will have to admit that we have here allowed Beauty to come into its own. We can herewith say that, among the numerous, excellently done illustrations that have issued from the artistic hand of Frau Dr. Toni Gürke, this must be classed in the first rank. The color and position of the flowers, as well as the appearance of the stems, are perfectly and accurately reproduced.

The plant is noteworthy in several respects. As soon as its name is met with, one is immediately drawn into the battle which was called into life by controversy within the German Cactus Society. My changing of the name *C. speciosissimus* into *C. speciosus* has been considered an unfortunate proceeding. I did this for two reasons: first, in the interest of accuracy, because *Cactus speciosus* was the name under which the plant was imported into Europe by Cavanilles, and, secondly, because I myself, in the work in which this name was first used, could not do otherwise than give preference to the oldest specific name. Moreover it may here be mentioned that the name *C. speciosissimus* P. DC., which was created after *Cactus speciosissimus* Desf., owed its origin to an error of Bonpland, the botanically-trained traveling-companion of Humboldt. He believed that *Cactus speciosus* Cav. was identical with *Phyllocactus phyllanthoides* Lk. Desfontaines knew of this error but instead of using Cavanilles' name as it was in the older classification he rejected it and named Cavanilles' plant *Cactus speciosissimus,* an unjustifiable proceeding at any time and under any circumstance.

Our plant is of further importance in that for certain botanists it is a bridge for uniting *Cereus* and *Phyllocactus.* I can not follow this view, although it cannot be denied that the relationship to *Phyllocactus Ackermannii* Lk. is very close. The absence of genuine spination on the stems and especially on the ovary appears to me to be sufficient reason for retaining *Phyllocactus* as a separate genus.

Some botanists believe that when two species from different genera are crossed and a hybrid results, that it presents a powerful argument for the union of those genera. In the case in question, a merging of *Cereus* and *Phyllocactus* had been suggested, for truly our *Cereus speciosus* has a great inclination for such hybridizing with species of *Phyllocactus.* We know of such occurrences with *Phyllocactus Ackermannii* Lk., *Cereus grandiflorus* Mill. or *C. nycticalus* Lk. The presence of *C. speciosus* can immediately be recognized through the gorgeous violet lustre which springs forth vividly in the corolla's interior. No less noticeable is the appearance of spines on the ovary. The great majority of the large, dark-red flowering Phyllocacti are derived from the flowers of *Cereus speciosus;* they are extraordinary ornaments for the cactus collection and are very widespread in the homes of the general public where they are often the only plants growing in the room.

All these hybrids, as well as *Cereus speciosus* itself, are plants usually easy to care for and despite the worst treatment, annually produce their glowingly-colored flowers.

Translation by Myron Kimnach

CLASSIFICATION—1949

Notes by W. TAYLOR MARSHALL

Heliocereus speciosus (Cavanilles) Britton and Rose.

Britton and Rose appropriately chose the name "Sun Cereus" for these day-flowering, terrestrial plants.

Plate 17

Cereus speciosus K. Sch.

From Blühende Kakteen—November 29, 1901.

Echinocactus Tulensis Pos.

Plate 18

Echinocactus Tulensis Poselger, in Allg. Gartenzeit. XVI (125); Karl Schumann, Gesamtbeschr. 432, with fig.

This plant has always made rare appearances in cactus collections and is today very desirable and not easily obtained. The reason for this is due to present collectors no longer having access to its habitat, which to my knowledge has been observed only by the author and later by Mathsson. I have not seen it imported during the last decade, although I would not assert that it has not occasionally appeared here during that time. Tula is situated in Tamaulipas, the northernmost of the states on the Gulf of Mexico, a region which is by no means sufficiently explored for cacti (as is also the case in the Pacific coast states) and which contains many new species.

The species belongs to that group in *Echinocactus* in which the ribs are completely divided, or furnished with tubercles. It therefore is related to *Mamillaria,* from which it could hardly be separated so long as the flowers were unknown. When these appear, however, the difference is obvious, as *Echinocactus* has flowers which arise near the crown and from the areoles of the tubercles, whereas in *Mamillaria* they are borne far from the crown and in the axils. But every cactiophile well knows that there are transitory stages between these extremes, thus completely justifying the saying: "Nature does not skip." I have heretofore mentioned that there are such transitions in all cactus genera and have termed these fluctuating forms "sliding species." Our *Echinocactus Tulensis* Pos. approaches these "sliding" forms.

While it may be said that in this and similar species the ribs are divided into tubercles by deep diagonal furrows, this expression can be used only figuratively speaking in order to make a comparison with the plainly ribbed species. For in reality the ribs do not become tubercled in the aforementioned manner but from the first the tubercles are brought forth from the growing point entirely separated and well rounded. Other examples of this type are known in which these tubercles or protrubences are placed in the same system of diagonal rows so well known in the Mamillarias. On counting these rows one will see that they occur in an unvarying ratio with striking regularity and, in the case of *Echinocactus Tulensis* Pos., it will be found that there are 8 ascending diagonal rows running from the lower left to upper right, and in the opposite direction from lower right to upper left, there are 13 ascending rows—a remarkable fact. This system of rows with the ratio 5, 8, 13, 21 is found, as I have previously explained, in almost all Mamillarias and to these must also be added all cacti with tubercles. We know that no such ratio exists where ribs alone are concerned, but it immediately appears when tubercles are present on these ribs. With this fact I think I have sufficient reason for recognizing this "ratio of rows." The next step in the proof—just why the rows are always arranged according to the numbers 5, 8, 13, 21—is yet to be successfully accomplished.

The *Echinocactus Tulensis* Pos. which is grown in the Royal Botanical Garden of Berlin had its origin in the collection of the author; it has a very slow growth as it is only 12 cm. high. It blooms every year in the spring, after the winter buds have first allowed their red heads to peep forth from the white areoles. Unless the plant is topped, offsets appear in extremely small numbers.

Translation by Myron Kimnach

CLASSIFICATION—1949

Notes by W. TAYLOR MARSHALL

Thelocactus tulensis (Poselger) Britton and Rose.

Thelocactus is an intermediate genus in which we find the dry fruits, dehiscing by a basal pore, as in *Echinocactus.* The flowers are borne at the base of a groove on the upper side of the tubercles, as in *Coryphantha.*

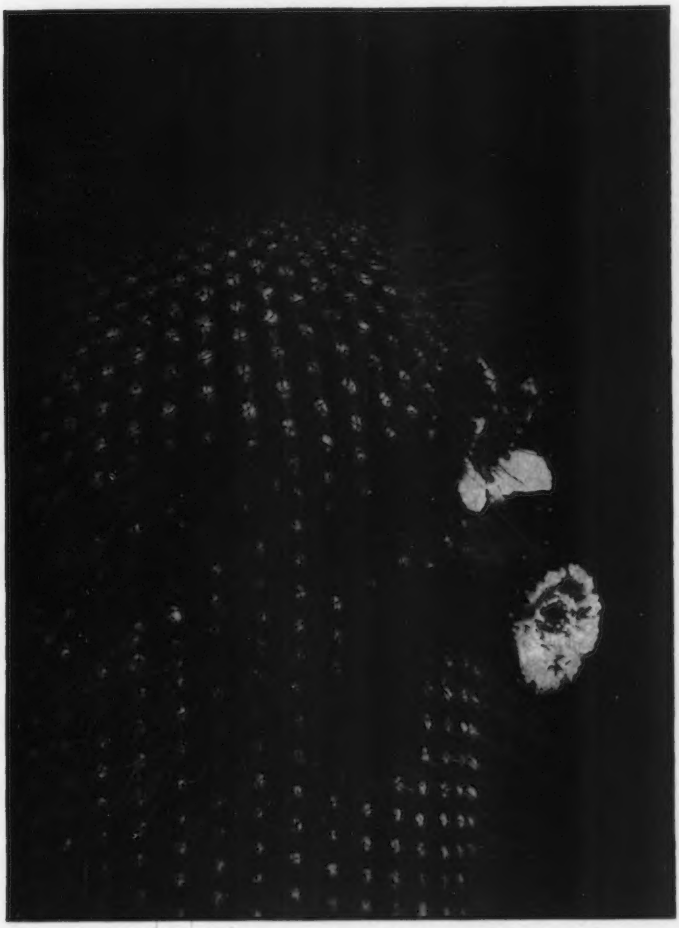


FIG. 77. Flower, ruptured fruit, and small buds. x 0.5

PILOCEREUS POLYLOPHUS Salm-Dyck

By JOHN POINDEXTER

Pilocereus polylophus is easily one of the most distinct of the Mexican Pilocerei. Nevertheless, it has been described rather incompletely, and in some points erroneously, so that the following material should be of interest.

The systematic position of *P. polylophus* has been questioned, although in many ways it is certainly in a class by itself. Of the more recent authors Britton and Rose, Bravo, Marshall and Backeberg all consider this species to be one of the Mexican Pilocerei. Britton and Rose and Bravo consider the Pilocerei as a Sub-Genus of *Cephalocereus* and other authors consider it as a genus, *Pilocereus*. The reason for the distinction is that in *Pilocereus* there is no distinct pseudocephalium. Backeberg further limits the genus to include only those plants in which the fruit is a roughly depressed sphere.

Werdermann placed this plant in *Lemaireocereus* where it seems to fit better than in *Pilocereus*, though it differs in the lack of spines on the fruit and the white pulp of the fruit. The rest of the Mexican Lemaireocerei have red pulp so far as I know, although some of the tropical

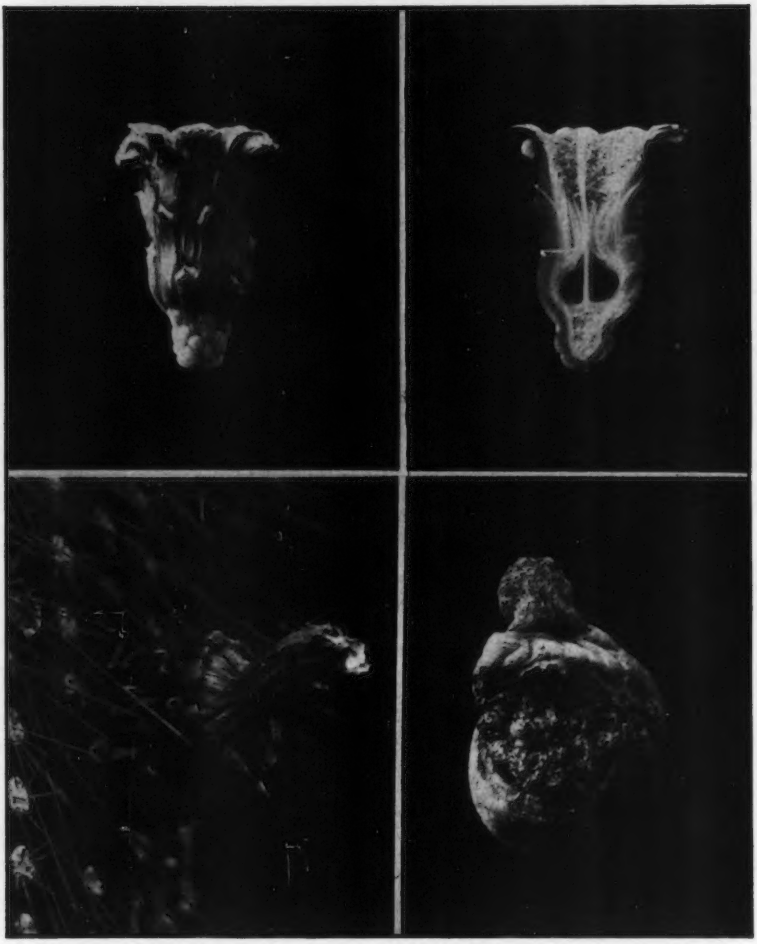


FIG. 78. Flower of *Pilocereus polylophus;* side view and longitudinal section, x 0.5. BOTTOM LEFT shows nearly mature fruit, x 1. BOTTOM RIGHT: *Pilocereus alensis,* ruptured fruit, x 0.8.

species do have white pulp. It seems to me to warrant a distinct sub-genus in *Lemaireocereus* because of the number of ribs, unbranched habit, the fleshy, adnate scales on the flowers and the fruit characteristics mentioned above.

The stem is erect and simple, reaching a height of ten to thirteen meters, although in cultivation one seldom encounters a plant of over four meters. The number of ribs is given by Britton and Rose as fifteen to eighteen. This count was obviously from an immature plant, and Bravo extended this count to as high as thirty ribs. Actually they often go considerably higher than this, and I have counted forty, forty-one and forty-two ribs respectively from three cultivated specimens of flowering size picked at random. This accounts for the difficulty that people often have in identifying this plant from the key in Britton and Rose.

The spines are a beautiful yellow color, somewhat darker at the growing point than elsewhere, bristly rather than stiff. There are seven to eight radial spines 1 to 2 cm. in length and one central spine somewhat longer.

The flowers are 5 to 8 cm. long, 2 to 3 cm. wide at the mouth, tubular-funnelform. The ovary is considerably narrower than the tube, about 6 to 10 mm. wide by 10 to 12 mm. long. The tube is 3 to 4 cm. long by 1 to 2 cm. in width. The basal part of the tube is a hollow

FIG. 79. *Pilocereus alensis*, flowers and fruit. x 0.3

cavity 6 to 10 mm. high, above which the hundreds of stamens are inserted in several series so that they completely fill the tube. The stamens are included, as is the pistil. The free portions of the perianth segments are 5 to 8 mm. in length, varying in color from a deep purplish-red on the outer segments to a light rose-pink with whitish margin on the inner petals. The perianth segments are reflexed at anthesis but close very quickly after the sun hits them. It is highly probable that the flower described in Britton and Rose had already started to close as the writer has observed these flowers often, and the petals are always reflexed. The tube is covered on the outside with purplish-red, fleshy, mucronate scales that are free from the tube only at the terminal tooth. The ovary is greenish, and here the scales are much shorter and thicker, more like warts than scales, though still toothed.

The scales are retained during the development of the fruit, which remains tubercled until the time it bursts. The shape of the fruit is quite different from that of other members of the genus as it always remains somewhat flattened at the apex and does not become as rounded as the other members of the Pilocerei. At maturity the fruit ruptures in several directions, more or less throwing out the contents as do the fruits of *Astrophytum*. This is contrary to the case with other Pilocerei, which generally ruptures along one transverse line. In *P. polylophus* the pulp and funicular strands are white, not crimson as they are in all of the other species of *Pilocereus* that the writer has observed.

The seeds are shaped like those of the other *Pilocereus* species, but are much larger, having eight to ten times the volume of the seeds of *P. palmeri* or *P. robinii*. In addition, these seeds float in water, while the seeds of all of the other species of Pilocereus, that I have encountered, sink.

The above notes show that this species is distinct and quite apart from the other Mexican Pilocerei in the number of ribs, in the flower, in the fruit, and in the seeds. Further study in the field and a more thorough study of cultivated plants might show that this plant should be in a separate series or Sub-Genus from the rest of the Pilocerei or possibly that the affinities of this plant are more with *Lemaireocereus*. According to Backeberg's 1942 diagnosis of the genus *Pilocereus*, *P. polylophus* must be excluded because he limited this genus to species with rounded fruits. The number of discrepancies observed in this one species illustrates very graphically the crying need for careful observation and study prior to any further revision of the Mexican *Cereae*. The fact that Dr. Yale Dawson recently (1948) published four new species of Cereae from Mexico shows that we possibly have not even covered the preliminary ground well enough to make our generic limits too precise as yet. If this is the case in Mexico, it must be much more the case with the South American cacti which are known to a very much slighter degree.

REVISED EDITION 1948

Trees of Santa Barbara has been enlarged and brought up to date. The author, Maunsell van Rensselaer was ably assisted by many well known specialists among whom are two of our Society members—E. O. Orpet and Reid Moran. In this enlarged edition 745 living species and varieties are listed, as well as 366 species and varieties formerly tried in the Santa Barbara region but are not known to exist at present. There are 67 illustrations and 216 pages, well printed and bound in heavy paper covers. Price paper bound—$1.75. Cloth bound—2.25. Published by the Santa Barbara Botanic Garden, Santa Barbara, California.

EDITOR'S NOTE

You will note that four pages of "Blühende Kakteen" have been reprinted in this issue plus an additional four pages. The post office requests that these pages be numbered like the rest of the JOURNAL since an installment reprint must be an integral part of the magazine. The next installment will have a plate showing the spiral arrangement of tubercles; our translator, Mr. Myron Kimnach, will have some interesting comments on this remarkable mathematical plan.

A VISIT TO MEXICO'S LARGEST CACTUS ESTABLISHMENT—LA QUINTA

By LADISLAUS CUTAK
Missouri Botanical Garden

During the early part of 1947 I had gone on a plant hunting trip to Mexico, spending a full month in the Isthmus of Tehuantepec. After completing my work in the Isthmus I left for Mexico City to be the guest of the late Dr. Juan Iwersen and two or three other cactus enthusiasts with whom I was to make several excursions into Queretaro, Hidalgo, Guanajuato and Michoacan.

On one occasion I had repaired myself to Cadereyta de Montes—a small town in Queretaro, located about 200 miles northwest of Mexico City—for the express purpose of visiting LA QUINTA, in my estimation, Mexico's largest cactus establishment where ten acres are devoted to the culture of desert plants for the commercial trade. The establishment is operated by Fernando and Carolina Schmoll and has been in existence for a quarter century. It is located in back of an ancient aqueduct, several blocks from the principal plaza and extends up a sloping stony hill from which commanding views of the city can be had. The aqueduct bears the name of "Las Fuentes," literally "The Fountains," and during the dry season its water content is low and covered with scum; but it is practically the only means of water for the community. A constant stream of aguadores (water-carriers) wends its way from Las Fuentes to every household in Cadereyta.

La Quinta is enclosed by a high brick wall, part of it cemented to add color and break the monotony of the building material. As one enters through a low door he immediately perceives to the right the living quarters and office of the manager in front of which are beds planted with specimen cacti. In the center of a circular bed stands a bushy Organ Pipe Cactus, *Lemaireocereus marginatus,* about 15 feet high and at its base are grouped circles of Echinofossulocacti, Mammillarias and Echeverias. To the left of this circle is another bed with a Candelabro or *Lemaireocereus Weberi* as a centerpiece and rows of Hen-and-Chicken Plants around it. Then come terraces with African Spurges or Euphorbias and back of these are the packing, cleaning and shipping sheds. Upon the next terrace are greenhouses, covered not with glass, but with cloth to shield the plants from the hot sun of mid-day. The elevated beds are repositories for various kinds of Pincushion Cacti and other small desert material in which La Quinta specializes. It is never too cold in Cadereyta, even in winter, but snow did fall the first since 1882 the following January after my visit and laid a blanket of white fluff over everything—a phenomenon to Cadereytans of even venerable age. Tall, spreading, lace-leaved Pepper Trees (Schinus molle) tower above the buildings and cast furtive shadows on the ground.

A living fence of Organ Pipe Cactus was resplendent with the peculiar scurfy funnelform blossoms crowded along the ribs. This species, *Lemaireocereus marginatus,* is commonly cultivated throughout the region as a hedge plant and when properly cared for forms an impenetrable barrier that even a rabbit could not negotiate. Beyond the range of cloth-houses and extending up the slope are beds in symmetrical designs—reminiscent of Old World sunken gardens but planted out with an All-American selection of xerophytes, including Golden Balls, Bishop Caps, Hedgehogs, Living Rocks, Pincushions, Barrel Cacti and Magueys. The upper slopes are as yet unimproved but massive Pulque Plants and enormous hedges of Prickly Pears are scattered about, the latter laden with luscious fruits which are made into preserves and which I am particularly fond of.

The wild section of the hill extends to the boundary wall on the right and below it are more beds, cloth houses and a greenhouse for growing seedlings, as well as a range for the growing of orchids. The seedling cacti are grown in flats and when large enough are transplanted into pots. In one patio entrance is a bed of plump stately *Pilocereus polylophus.* This is a yellow-green cactus, attaining a height of 30 feet or more in native Hidalgo and is characterized by many shallow ribs covered with small, white-felted areoles from which issue slender straight yellowish spines. In my estimation, it is one of the handsomest of the majestic Torch Cacti.

In another bed many varieties of Echinofossulocactus were blooming. This genus of curious small globular-depressed cacti is peculiar to central Mexico and is characterized by innumerable thin, more or less wavy ribs. One of the best known is *E. multicostatus,* which has at least 100 ribs to the plant body although the

surface growth has a diameter of only four inches or less. It is a true curiosity indeed and looks out of this world—more like a fossil than a living thing! Most of the Echinofossulocacti possess two types of spines, the uppers often strongly-flattened and ribbon-like, the lower usually much shorter, slenderer, setaceous to acicular or often weak-subulate. The flowers

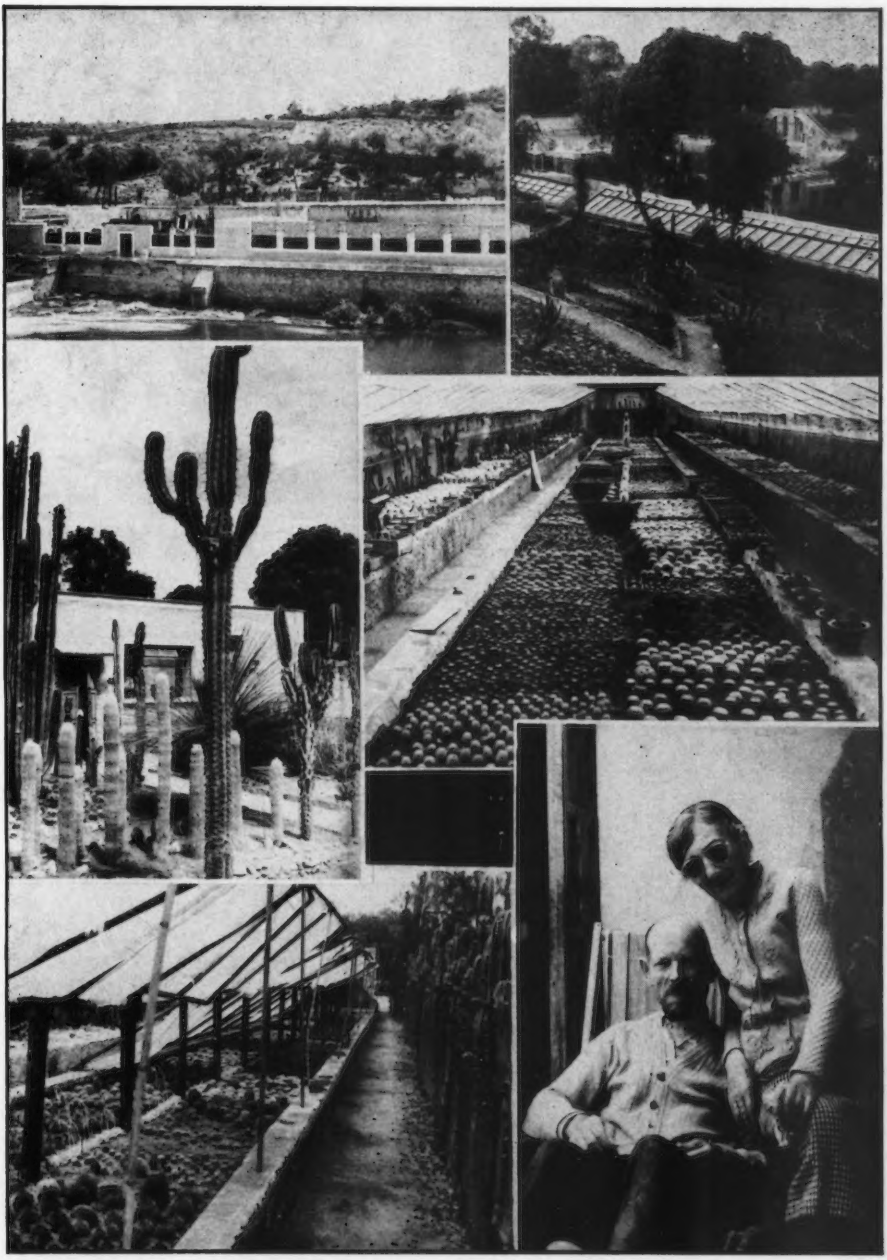


FIG. 80. TOP LEFT: La Quinta sprawls out over a hil l and covers about 10 acres. Many plants are grown in formal beds; others in cloth houses. LOWER RI GHT: Mr. and Mrs. Fernando Schmoll. Cutak photos.

are small, and free-flowering from the top of the plant, usually pink to lavender or purple in color but also white to cream to pale yellow.

Although hundreds of Neolloydias, Thelocacti, Astrophytums, Ferocacti and other short-cylindric to globular groups are represented, none are so eye-appealing as the Mammillarias or Pincushion Cacti. La Quinta seems to possess the greatest array of these ever assembled in one place. There are simple individuals, clusters, crests and grafted specimens. I saw monstrous crests of the common *M. compressa;* one of these as big as a washtub was donated to our Garden but unfortunately had to be cut up because rot had set in while the plant was in transit. *M. compressa* grows in great abundance in the central plateau region and sometimes massive heads cling to nearly perpendicular cliffs. Apparently seeds find an ideal location in the crevices of rock walls and grows to maturity with a cluster of "babies" all around them tightly compressed into huge beautiful mounds. *M. Parkinsonii* is a worthy rival of the above. It also forms large mounds completely covered by white radial spines, further enhanced by the long, milky-white centrals which slightly recurve or have a tortuous twist to them. Mammillarias really are the darlings of the whole Cactus family. At La Quinta I saw 2- and 3-headed clusters of *M. supertexta* that looked like they were turned on a lathe. The globose stems are characterized by innumerable small tubercles and an armament of very short spines. One immediately falls in love with this species and hopes to acquire it for his collection.

I could rave endlessly about the plants on display at La Quinta but perhaps some of the pictures will compensate for mere words at description. However, before writing finish to my story, I want to get you acquainted with the couple who made La Quinta such a showplace. La Quinta is truly an attractive place to visit. Its only drawback lies in the fact that it is not situated on the Pan-American Highway where it would be readily accessible to the tourists who go down to Mexico City. However, Cadereyta can be reached easily by auto from Ixmiquilpan by way of San Juan del Rio and Tequisquiapan. The road to San Juan is paved but to the latter town it was in a state of repairs, so a dusty rutted detour, paralleling the road, had to be taken. Tequisquiapan is the site of mineral springs.

Fernando Schmoll was an artist—a painter of landscapes, while his devoted wife loved nature and living things in it. When her husband painted, Carolina Schmoll combed the region for cactus plants. In time, exploring became an insatiable part of her. She made trips on muleback to almost inaccessible canyons. Despite the fact that she was never a strong woman physically she tramped often where hardy men failed to go alone. She learned the habits and whims of cactus plants in their wild haunts. She got acquainted with the many forms and variations encountered in nature. She brought to light many obscure points about little known cacti. In fact, she has enriched our knowledge of these desert endemics very much. Check back through leading American, English and German journals and you will find many references to the Schmoll discoveries. It is regrettable that Mrs. Schmoll did not compile her notes and observations made in earlier years. What a valuable source of information they would have been today!

If any of you folks contemplate a trip to Mexico include La Quinta in your itinerary. If you have a few days more to spare inspect the cactus regions around Cadereyta. In every direction trails lead to haunts of our beloved cacti. Mrs. Schmoll will gladly give you information.

BACKEBERG WRITINGS AVAILABLE

1. *Blatter Fur Kakteenforschung* (BFK) Backeberg. This periodical Bulletin of Cactus Research was published from 1934-1938; this complete set contains 460 pages and 250 photos. This is the only publication of Backeberg that contains an English summary. Unbound.....$6.50
2. Backeberg's 1934 *Catalogue.* 40 pages with 72 excellent illustrations..... 50c

Cactaceae—*Jahrbuch der Deutschen Kakteen Gesellschaft* (Year-book of the German Cactus Society).

3. May, 1937, *Erster Teil,* Backeberg, Buxbaum, Porsch $3.50
4. Oct., 1937, *Zweiter Teil* (Two parts in one) same authors $3.50
5. Oct., 1939, *Zweiter Teil, Backberg* "Argentina Cactus of Hosseus, 56 pages.....$5.00
6. (June, 1942) 1941 *Zweiter Teil, Lindley* (Backeberg) "Systematic Review" 80 pages.....$5.00
7. (Dec., 1942) 1942 *Zweiter Teil,* Backeberg, "Origin of Cacti" (*Zur Geschichte der Kakteen*) 72 pgs. $5.00
8. (Sept., 1944) 1943-44 Backeberg, "Distribution of Cacti;" primarily a reference work, it is in three sections: The first section breaks the New World distribution down into regions which are more or less geographic and at the same time more or less based on the natural relationships of the cacti in the region. The second section is a list of the natural groups from sub-family down to genus or sub-genus showing their distribution, and giving the type locality of the type species. The third section is composed of maps which illustrate the points covered in the second section. There is also a table of contents for the maps.. With 44 maps and 136 pages paper bound.....$5.00
9. 1942. "New Species by Curt Backeberg" in "Stachlig Wildnis".....$1.00

Above items are all in German except No. 1 as noted. The following sets are available: All nine items $35.00 postpaid.

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NEW WAYS IN CACTOLOGY

By CURT BACKEBERG
Translation by JOHN POINDEXTER

PART IV

Morawetzia: Was placed in *Oreocereus* by Marshall: Here we have an especially crass example of the lack of knowledge of South American material. It is said that the "flowers develop only higher than they do in other species." The truth is that we have here, as in *Arrojadoa* and *Stephanocereus* a terminal cephalium! This with the hairy flowers of the Tribe LOXANTHOCEREAE, which Prof. Porsch has described as one of the best founded groups of cacti from the point of view of evolution, is a special parallel stage to the terminal flowering CEPHALOCEREAE.

Alyostera Speg.: Was set up as a Sub-Genus of *Rebutia. Rebutia*—has naked flowers, the tube and the style not united. *Aylostera*—has bristled flowers, the tube and the style united.

Mediolobivia, Acantholobivia: Were not recognized by Marshall "because they belong to *Lobivia.*" *Mediolobivia* with its soft body and flat tubercles stands much closer to *Rebutia,* and has bristled ovaries; *Acantholobivia* has peculiarly closed flowers and spiny fruits. In Europe no one has yet considered *Mediolobivia* to be the same as *Lobivia.*

Neochilenia: The history of the name *Chilenia* as well as *Chileniopsis* is confused from the start. Rose did not realize that he had united in *Neoporteria,* two entirely different genera. This is the basis of the differences of opinions. Marshall states that "it is like dividing the horse into four pieces" if one separates *Neoporteria* and *Neochilenia.* This sentence and the recognizable fact that Marshall is not familiar with the difference between the two groups characterize his whole work, although he often indicates that he believes my work to be superficial. The limitation of *Neoporteria* as a genus may be ex-

FIG. 81. Flower of *Morawetzia* originating in a true top cephalium with accumulated hairs and more bristle-like spines.

FIG. 82. *Arrojadoa* produces its flowers from a terminal cephalium. John Poindexter photo.

plained by the fact that Rose apparently did not see the flowers of any of the rotate flowered Neochilenias, as he only pictured the plants in those species.

Horridocactus: According to Marshall, "useless," and should be placed in *Pyrrhocactus*. To me it appears that it would "be useful" for him to study the literature more deeply. How can one explain the presence of Chilean spherical cacti west of the 4,000 meter high Aconcagua Pass in the Andes by placing them with plants which occur only east of this barrier? The peculiar group developed as a result of the separation brought about by the uplift of the Andes from South to North. Helmich says in *Die Bedeutung des Andenraumes im Biogeographischen Bilde Südamerikas,* that the xerophytic vegetation of Mendoza and the corresponding Chilean vegetation of the same latitude are entirely different.* It is expressly observed in this publication that Chile forms a special area in the South American Continent.

FIG. 83. *Horridocactus kesselbringianus* shows the same rotate flower as in *Neochilenia*. Compare this with the closed flower of *Neoporteria*.

Pyrrhocactus comes from Argentina and has stiff bristles on the tube, *Horridocactus* only minute scales, and the fruit is almost naked.

Eriocactus, Brazilicactus: These were placed in *Notocactus* by Marshall. It is inconceivable that previously all these species of these genera were thrown together, even though the fruits alone were entirely different.

1. *Notocactus*—fruit elongated and becoming somewhat hollow, bearing wool only.

2. *Eriocactus*—fruit more or less rounded, heavily wooled, and firm-walled fruit which remain filled with pulp.

3. *Brazilicactus*—fruit small and spiny.

How one can throw *Eriocactus* and *Brazilicactus* together after considering the flowers is impossible for me to understand. It is a sin of omission in former times that has by now been raised to a principle. Of all the species, only those which have a purple stigma like that in *Malacocarpus* belong to *Notocactus*. Rose made this group into a complete hodge-podge.

Soehrensia: Marshall places this plant from Argentina with the Chilean *Eriosyce*. Like many Chilean cacti, the latter has bristles on the flowers, *Soehrensia* none. The latter forms no wool top either. See the geographic observations under *Horridocactus*.

Islaya: was united with *Parodia*. This is a grotesque combination. Marshall writes "Borg and botanists for the most part, unite these." Then this mysterious number of botanists know these particular plants as little as Borg does. Buxbaum is the only one who has extensively studied the fruit from an anatomical point of view and has described the genus as especially distinct. The fruit grows in length, is thin skinned, the seeds sit in a ring in the special sac in the chamber of the ovary which finally becomes completely hollow. Geographic considerations further mitigate against the union of these genera (See Helmich, Op. Cit.).

Pseudozygocactus: This Marshall united to *Rhipsalis* with the statement that the stems were epiphyllum-like, and that as the stems are quite variable in *Rhipsalis* one can see no necessity for dividing them. The facts that terminal flowers (See *Hariota* Br. & R.) and angled ovaries are present here were simply overlooked, and therefor, the question is argued on the basis of incidental features.

All of the genera established by me have been discussed. So much for the correction of Marshall's findings. I must naturally leave it to the reader to form his own opinion concerning my position and to make his own criticism. My general position follows:

1. In Marshall's revision all large evolutionary groupings, the major relationships and areal geographic viewpoints are not considered; thus

*Publication of the 16ero Amerik. Inst., Hamburg, 1940, p. 69.

FIG. 84. A grafted plant of the rare *Islaya moleuvensis*.

any progress that had been made toward a more natural classification was also given up.

2. The merging of genera and the results that stem from this show quite a limited knowledge of the South American material. The characterization of a group is frequently lacking in precision, even erroneous. The work of others is passed over in a manner which would be inadmissable for a conscientious botanist.

3. Marshall's revision may be a simplified digest for the benefit of collectors, but it still burdens science with the changes in synonomy and in comparison with modern requirements is retrogressive and inadequate. One might prophecy that those who really know cacti will not follow it.

4. The conspicuous and often considered elimination, primarily of the German publications is probably only due to the fact that the revision was developed in war time. That should have been avoided.

The errors to be found in this revision illustrate just how important the method developed by Britton and Rose for the study of cacti is: namely to visit all of the plants in their habitat, and study the plants very carefully from living material, then to draw up the descriptions of the plants and determine the distinguishing characteristics with the utmost exactitude. Therefore I consider that my methods and my genera must still stand as good. Regarding the genera of Britton and Rose that were assimilated in Marshall's revision I am not at all convinced. To me the names of these highly respected American authors is sufficient to make me approach the question with a great deal of caution.

The new genera which were recognized by Marshall I am unable to discuss, as I have not yet received copies of the diagnoses. I hope to be able to study them in the near future.

In conclusion let us return once more to my revision. I can only mention here very briefly what was published in three comprehensive papers, but it may suffice to clarify the situation a little.

First, what is the historical background of my work?

Berger first showed some of the fundamental weaknesses of the arrangement in Britton and Rose. Unfortunately at this time many of the plants were still unknown or very imperfectly known, and this great student of the succulents died before he could carry out his work in more detail.

My discovery of a missing link to the Colombian Mammillaria in Maracay, Venezuela, and several cases of extreme endemism led me to wonder how the distribution of cacti as a whole came about. It seemed possible that this approach might solve the question of the relationships of the different groups of cacti to each other.

I was further stimulated by Irmscher, who had already made similar and much more comprehensive studies, to reconstruct the development of the cactus distribution from geological times to the present. The discovery of the fossil *Eopuntia* right in one of the areas provided a very strong support for the reconstruction itself. From the reconstruction it now became obvious that the cacti had their origin in the tropical area of the Cretaceous times and that there had been an outward migration of forms from the tropics to the North and to the South. The clarity of this situation is obscured somewhat by the wandering of the tropical belt to the north and to the south in various geological periods. However, this general principal explains the pronounced differences between the cacti of South America and North America and why the situation becomes more complicated in the tropical regions.

Having assumed this geographical relationship to the evolutionary development of the cacti and seen it work out, I next applied it in a more detailed way and found out that it made clear the relationships of the smaller groups of cacti. It was in this way that many of the genera described above were first arrived at. Then it became necessary to characterize these small groups and to do this I used the method developed by Britton and Rose of distinguishing groups by the most precise characters possible. This done, the next stage was to assemble these small groups into Clans, Sub-Tribes, Tribes and so on, working out the picture which Berger originally sketched in 1926.

This method has provided a means for breaking down the very difficult *Cephalocereus* group into its component parts, and to explain the complex distribution of the South American spherical cacti, the Peruvian Melocacti, the peculiar cacti of the Galapagos Islands, and Fernando Noronha, the Mammillaria of Colombia, and many other problems, too numerous to mention here.

We could not study these matters at all if we were to follow Marshall's method of study, that is mere visual observation of the plant. It may suffice for the amateur collector, but the true student is always pushing into new territory. It is my belief that the method I have used is the right one for reaching these modern goals, and it has certainly been my conscious desire to make a substantial progress toward a more thorough knowledge of the cacti as a whole as well as in specific detail.

The end

QUESTIONS and ANSWERS

Conducted by
HARRY JOHNSON
Paramount, Calif.

Question: Can you name a few species of cacit native to Mexico or South America likely to survive temperatures as low as 15° to 20° and 30 inches annual rainfall? Edwin F. Wiegand, N. J.

Answer: I can only name those worth a try. Local conditions often have a decided influence on a plant's resistance to cold. *Trichocereus Bridgesii, T. cuzcoensis, Lobivia incaica, L. mistiensis,* probably many others. *Oroya peruviana, Oreocereus Celsianus, Mammillaria Vaupelii, M. Parkinsonii, M. elegans, M. Heyderi* (Coral Cactus), *M. compressa, M. Werdermanniana, M. dealbata, Notocactus mammulosus, N. submammulosus, N. scopa, Ferocactus viridescens, Echinocactus ingens, E. Grusonii, E. horizonthalonius, Astrophytum myriostigma, A. asterias, Thelocactus bicolor, Escobaria, tuberculosa, Pyrrhocactus horridus, Ariocarpus* all varieties, *Echinopsis* most species, and *Lophophora Williamsii.* I could name scores more that have withstood temperatures down to 15°-20°. Remember that hardiness is the sum of the interplay of a series of factors involved in a plant's reactions to its environment. Much depends upon the way a plant is grown. If the growing period is short and the plant has no soft, poorly matured growth, it will probably stand several degrees more of cold. Old plants seem to survive better than young ones. Established plants also come through better. I am frank to say that after 40 years of growing plants I am always stumbling on to facts that don't fit into my own preconceived notions!

Question: Can you give the cultural requirements of *Sedum Morganianum,* the Burro Tail? Mrs. R. M. Gunnison, N. Y.

Answer: The Burro Tail seems to enjoy a cool location with plenty of light or broken sunlight. It does not do its best in hot, sunny locations. Give it regular waterings, allowing it to dry out between times. The soil should be a good sandy loam particularly if you are inclined to overwater. It likes plenty of fresh air or the leaves may drop. Fully developed plants are beautiful with perfect tails up to 3 feet long.

Question: What shall I do to keep my Old Man Cactus? Mrs. R. Dedham, Mo.

Answer: The Old Man Cactus (*Cephalocereus senilis*) requires a quite sandy open soil. This is paramount in its culture. A good compost is 2 parts coarse sand, 1 part light loam, ½ part charcoal, ½ part leafmold. After planting, do not water heavily. If soil is barely damp at planting, wait a week before giving any moisture at all—then just moisten the surface. Treat it this way for at least a month. It takes two to three months for most cacti to get re-rooted after moving. Never saturate the soil. Better to water more often and lightly, allowing the plants to dry out well between waterings. Give plenty of fresh air and light. The base of the plant must not be below the soil. Rotting occurs at the soil line, so keep the base high.

Question: Can you tell me how to grow *Ceropegia Woodii,* the Heart or Rosary Vine? Mrs. G. M. Anderson, Texas.

Answer: The tuberous Ceropegias such as *C. Woodii, C. Barkleyi, C. debilis,* etc., delight in a cool location though they will do well also in quite warm spots. They like a light but not sunny exposure, and when growing need quite a bit of moisture. Their greatest period of growth seems to be from April to July though they can be found in growth all the year around. They are splendid for hanging baskets and pots with the stems hanging down in curtains sometimes for several feet. Their curious parasol-like purple flowers are very complicated and apparently are pollinated by tiny flies. They are related to the Stapelias which may seem hard to believe. Many species are known, some having striking white and purple or spotted flowers; some are vines; others are shrubby. Probably 6 or 8 species are in cultivation now. Others could be introduced.

SPINE CHATS

LADISLAUS CUTAK

June is the month when *Coryphantha Runyonii* displays its flowers. This cactus is native of the Lower Rio Grande Valley in Texas and was named for Robert Runyon, who first observed it in abundance around Rio Grande City. It is closely allied to *C. macromeris* from which it differs by having fewer, shorter spines and shorter tubercles. Mr. Runyon has been a keen student of cacti and other plants—collecting, writing and photographing them. I had the pleasure of meeting this ardent cactophile while collecting in Texas in 1938 and have pleasant memories of a visit to the Rabb Palm Grove (the only native palm reserve in Texas) with him.

Coryphantha Runyonii forms low clumps of 10 to 50 heads. Individual stems produce thick elongated taproots, 10 mm. or more in thickness. The stems are greyish green in color and are composed of prominent tubercles which are arranged irregularly. The tubercles are terete but somewhat flattened on the upper side, where a groove extends about halfway down from the tip but never to the base as in most Coryphanthas. The tubercles average 2 cm. long and about 1.5 cm. in width at the base. There are 6 to 9 spreading, acicular radial spines in each areole, irregular in length (usually 1-3 cm. long) and variable in color. The radials are mostly white to yellowish but occasionally a few brownish ones are present. The centrals are solitary but on older plants as high as three may be apparent, these of a dark chocolate to black color, slightly angled, 3 cm. or more long. The flowers open in bright sunlight and close for the night, reopening the next day. The flowers are quite large, being 4 cm. long and equally as broad when fully expanded. Outer perianth segments are ciliate, greenish to brownish in color with pinkish margins. Inner perianth segments are somewhat spatulate, oblong, acute, delicately frilled at the tips, deep pink in the middle with paler margins, 3 cm. long. Stamens are short, about 1 cm. long, with purplish filaments and deep yellowish anthers. The style is purplish, exceeding the stamens, and surmounted by 7 thickened, obtuse, white stigma lobes nearly 3 mm. long. Ovary is light green.

The culture of *Coryphantha Runyonii* is easy. It can stand moderately rich and porous soil, moderate watering and full sunshine.

* * *

We learn from *The Modern Cemetery* (Jan-Feb., 1949) that an extinct volcano, high above the city of Honolulu, will be the resting place for some 19,000 fallen soldiers, sailors, marines and aviators from World War II. The crater of this extinct volcano is known as Punchbowl Crater. The steep outside of the ancient volcano is cloaked in many varieties of flowering cactus, making it inaccessible except by the road that spirals around the crater to an opening in its side. This cleft in the rim, facing Diamond Head, will be the cemetery entrance.

* * *

Franz Verdoorn in Chronica Botanica (9:150, 1945) writes about the preparation of *Aloe* as herbarium material as practised in the National Herbarium, Pretoria. I'm passing this information on to you hoping it might aid in preparing dry material for the herbarium of like succulents. This method has proven quite satisfactory, although it may still be improved upon. The inflorescence is submerged as soon as possible in diluted formalin (4%) and left there for 24 hours. This kills the tissues quickly, preventing the dropping of the flowers, and gives them a certain degree of toughness. When the inflorescence is taken from the large porcelain drum containing the formalin it is left to drain for a few minutes and then cut so as to fit onto the standard herbarium sheet. If representative parts will not fit onto one sheet two or more sheets may be used for the one specimen. Very dense and thick racemes are cut through longitudinally. The leaves are treated separately; very thick ones and those that are spotted are not always put into formalin but may be sliced through, carefully leaving the upper surface with the horny and usually spiny margin intact. Both upper and lower surfaces are kept. In order to indicate the thickness and original shape of the leaf a cross section is cut (just above the base). This cross section is outlined in pencil or an impression of the section is made on paper to be preserved with the specimen. All the prepared parts of the plant are then put into a press where artificial heat from electric elements dries it within about 48 hours. Wherever possible these mounted specimens are supplemented in the herbarium by good photographs, such as a habitat photo, a close-up of the whole plant and a life size photo of 5 of the flowers (from bud stage to the fertilized flower).

* * *

Molly Peacock Stenberg lived for seven years on the Wind River Indian Reservation in Wyoming as the wife of an Indian service employee. She made a special study of the Peyote religion among the Wyoming Indians and her position provided a helpful background of knowledge and sympathetic understanding of the Indian situation. The cult was studied as a social phenomenon, functioning as a transitional link in the Indian's adjustment from his indigenous culture to the imposed social organization of the white man. She was permitted to participate in Peyote meetings, a privilege never before granted on the Wind River Reservation to a white woman. Thus she obtained data from the participation in the ceremony, observation, interview, and study of the literature and pertinent documents. Mrs. Stenberg describes the physiological and psychological effects derived from the use of the peyote plant in the ceremony. The use of peyote in connection with religious ceremonies was old in Mexico when the Spaniards came in the early sixteenth century. The ancient people of central Mexico obtained their supply through the medium of messengers, consecrated for the purpose, who observed certain rites in collecting the herb. The use of peyote in religion reached the United States about 1870 and the Kiowas and Comanches of Oklahoma passed it on to other tribes in our country. Peyote is a member of the cactus family and is known in botanical circles as *Lophophora Williamsii*. Stenberg's excellent thesis appeared in the University of Wyoming Publications, Vol. 12, No. 4, pp. 85-156, September 15, 1946.

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BOOK NOTES

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